Technical Memorandum

Progress Report
Phase I Vadose Zone Remediation Activities
Installation Restoration Program Site 24
Volatile Organic Compound (VOC) Source Area
Marine Corps Air Station, El Toro

15 April 1999

Prepared by
Southwest Division, Naval Facilities Engineering Command
BRAC Operations Office
San Diego, California

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Transmittal

Date: April 15, 1999

From: David B. DeMars DBD
Remedial Project Manager
IRP Site 24, MCAS El Toro

Via: Andy Piszkin
Lead Remedial Project Manager F.A. Piszkin 4-12-99
MCAS El Toro

To: Glenn Kistner, Remedial Project Manager
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Subj: April 1999 Progress Report
Phase I Vadose Zone Remediation, Installation Restoration Program Site 24
Marine Corps Air Station, El Toro

Transmitted for your information is the subject progress report. Please do not hesitate to contact me at (619) 532-4163 if you have questions pertaining to this project.

CF:
Joseph Joyce (MCAS El Toro)
Polin Modanlou (Orange County)
Pat Brooks (Bechtel National, Inc.)
Eric Peterson, Crispin Wanyoike (Earth Tech)
Bill Sedlak (OHM/IT)
Project Files

File: bctcover.doc

OHM Remediation
Services Corp.
A Member of The IT Group

April 15, 1999

Ms. Bozier H. Demaree
Contracting Officer
Naval Facilities Engineering Command
Southwest Division
1220 Pacific Highway
San Diego, CA 92132-5187

Attention: Ms. Lynn Hornecker, 5BME.LMH

Subject: **Transmittal of April 1999 Progress Report, Phase I Vadose Zone Remediation, IRP Site 24, MCAS El Toro**
Contract N68711-93-D-1459, Delivery Order 065,
Removal and Remedial Actions at IRP Sites, MCAS El Toro, California

Dear Ms. Hornecker:

Attached are 4 copies of the April 1999 Progress Report for IRP Site 24, as requested in our discussions on April 9, 1999. Additional copies have been forwarded, with the cover Transmittal from Dave DeMars, directly to the following persons:

Mr. Glenn Kistner, RPM, U.S. EPA Region IX (2 copies)
Mr. Tayseer Mahmoud, RPM, California DTSC (2 copies)
Ms. Patricia Hannon, RPM, Regional Water Quality Control Board, Santa Ana Region (2 copies)
Pat Brooks, Bechtel National Inc. (2 copies)
Polin Modanlou, (Orange County)
Eric Peterson/Crispin Wanyoike, Earth Tech (2 copies)
Michael Pound (RTM) (1 copy)
Joseph Joyce (BEC) (1 copy)
Scott Kehe, (ROICC) (1 copy)
Lucreatria Holloway, (COTR (1 copy)

Two copies have also been sent to the Administrative Record, as you requested.

If you have any questions or need additional copies of the document, please let me know.

Sincerely,

William Sedlak
Sr. Project Manager

cc: OHM PMO File (1C/1E)
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Section 1
Introduction

The purpose of this technical memorandum is to provide an update on the start-up activities associated with the remediation of the vadose zone at Installation Restoration Program (IRP) Site 24 - the Volatile Organic Compound (VOC) Source Area - at the Marine Corps Air Station, El Toro. This technical memorandum describes start-up and testing activities that were conducted during the period from late February through late March 1999.

Section 2
Field Activities

Central System Start-up Activities
Flexible hose was installed to connect vapor extraction wells 24SVE11, 24SVE11A, and 24SVE161 to the Central Soil Vapor Extraction (SVE) Treatment System (Central System).

Soil Vapor Extraction (SVE) Testing Activities
Soil vapor extraction rebound tests, utilizing portable SVE treatment units, were conducted at Wells 24SVE14 and 24SVE54 during the February - March 1999 time period. Selected influent TCE vapor concentrations and flow information are presented in Table 1. Updated TCE levels in the deep vadose zone are shown on Exhibit 1, and selected influent concentrations from wells 24SVE14 and 24SVE54 are presented on Exhibit 2. A photograph of a portable SVE unit operating at well 24SVE14 is presented as Exhibit 3.

Soil Gas Survey Update
Preliminary analytical data for three soil gas points, received following the publication of the March 1999 Progress Report, is presented below:

Sample Point	***Depth of Sample***	***TCE (ug/L)***	***Freon 113 (ug/)***
24SG136	*46.5*	*ND*	*876*
(adjacent to Building 324)	*73*	*0.0017*	*0.67*
	95	*ND*	*116*
24SG109	*50*	*0.12*	*11.4*
(near Central System)	*72*	*ND*	*ND*
	92.5	*2.2*	*77*
24SG120	*51.5*	*0.34*	*0.11*
(near Building 315)	*74.5*	*ND*	*ND*
	96	*1.1*	*12*

Remediation at Remote Well Locations
Portable SVE units will be utilized to conduct additional tests, as necessary, and to remediate the vadose zone at remote well locations.

Other Information
The March 1999 progress report incorrectly stated that four piezometers had been constructed, while Table 1 in the same report identified three new piezometers (24SVP14S, 24SVP54S, and 24SVP54N). The correct number of piezometers that were installed during February and March 1999 is three.

In accordance with the public notice that was published on 16 January 1999 and the presentation to the public and regulatory agencies at the 27 January 1999 Restoration Advisory Board meeting, remediation at IRP Site 24 commenced on 30 March 1999.

Tentative Schedule for Central System and Other Activities

Activity	Tentative Completion Date
Start-up Activities	
Central SVE Treatment System Assembly (Central System)	December 1998 (actual)
Publish Public Notice	16 January 1999 (actual)
Public Presentation (Briefing)	27 January 1999 (actual)
First Central System Low Flow Test	28 January 1999 (actual)
LRA Site Visit	19 February 1999 (actual)
Begin Remediation Activities	30 March 1999 (actual)
Rebound Testing at Existing Wells	April 1999
Central System Start-up and Testing	May 1999
Soil Gas Sampling	July 1999
Phase I Well Construction and System Operation	September 1999

Section 3
References and/or Sources of Information

Bechtel National, Inc. 1995. Final Field Sampling Plan, Phase II Remedial Investigation/Feasibility Study, Marine Corps Air Station, El Toro, California.

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OHM. 1996. Technical Memorandum, Continuation of CLEAN II Site 24 Soil Vapor Extraction Pilot Test, Marine Corps Air Station, El Toro, California. October. [Includes Standard Operating Procedures and Health and Safety Plan]

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Southwest Division, Naval Facilities Engineering Command. 1999. Technical Memorandum, Progress Report, Phase I Vadose Zone Remediation Activities, IRP Site 24, MCAS El Toro. March.

United States Marine Corps Air Station, El Toro. 1998. Correspondence: Letter dated 2 December 1998 to BRAC Cleanup Team Members pertaining to Central SVE System Start-Up, Testing, and Evaluation Activities.

United States Marine Corps Air Station, El Toro, California. 1997. Draft Final Record of Decision, Operable Units 2A and 3A, No Action Sites, Marine Corps Air Station, El Toro, California. September.

For discussion only

Table 1. History and Status of Soil Vapor Extraction (SVE) Testing Operations at IRP Site 24, MCAS El Toro (Updated 31 March 1999)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE1	91 to 109	Note: Soil gas sample via 24CPT31 at 105 feet had 6,120 ug/L of TCE on 29 August 1995. Well 24SVE1 was constructed in 1995. 19 days (10 Jun - 8 Jul 1996) 1 day or 4 hours (23 Oct 96) 84 days or 1,981.5 hours (18 Dec 96 - 12 Mar 97) 1 day or 4 hours (14 Mar 97) 1 day or 4 hours (12 May 97) 5 days approximately (1 - 5 Jun 98) 54 days (7 Oct – 30 Nov 98) ***TOTAL: 164 days approximately***	**910** **120** **73** **89** **37** **8.7**	23 Oct 96 12 May 97 5 Jun 98 9 Oct 98 5 Nov 98 30 Nov 98	Travel time: 1.4 days per pore volume (EDR). Approx. 114 pore volumes removed during tests (as of November 1998).	225 cfm at 42" (1996)	1.15 pound (1996) **435 pounds (through 1997)** Calculations in progress for 1998 tests
24SVE2	80 to 105	**Note:** Soil gas sample via 24CPT27 at 92 feet had 615 ug/L of TCE on 1 September 1995. **Well 24SVE2 was constructed in 1995.** **1 day** or 4 hours (11 Nov 96) 4 days (7 - 11 Jan 99)	**160** **230** **240 (230** duplicate) **320**	11 Nov 96 7 Jan 99 8 Jan 99 11 Jan 99	100 IWG applied at 24SVE2 resulted in 0.5 IWG at 24SVE7 (396 feet away) during 1996 pilot test	131 at 100" (1996)	0.31 pound (1996)
24SVE2A	40 to 70	**Note:** Soil gas sample via 24CPT27 at 69 feet had 390 ug/L of TCE on 1 September 1995. **Well 24SVE2A was constructed in 1995.** **1 day** or 4 hours (13 Nov 96) 2 days (11 – 13 Jan 99)	**150** **57** **75**	13 Nov 96 11 Jan 99 13 Jan 99		44 cfm at 80" (1996)	0.08 pound (1996)
24SVP2 Piezometer	27.25-27.75 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	32	7 Jan 99		Not measured	
24SVE3	80 to 105	Note: Soil gas sample via 24CPT81 at 90 feet had 1,007 ug/L of TCE on 29 November 1995. Well 24SVE3 was constructed in 1995. **1 day** or 4 hours (4 Nov 96) **65 days** or 1,536 hours (21 July - 24 September 1997) **6 days (22 – 28 Dec 98)** ***TOTAL: 72 days approximately***	**1100** **980** **160** **140 (139** duplicate) **110**	4 Nov 96 21 Jul 97 24 Sep 97 23 Dec 98 28 Dec 98		22 cfm at 100" (1996)	0.36 pound (1996) **59 pounds (through 1997)**
24SVE3A	45 to 60	**Note:** Soil gas sample via 24CPT81 at 58 feet had 3 ug/L of TCE on 29 November 1995**Well 24SVE3A was constructed in 1995.** **1 day** or 4 hours (5 Nov 96) 7 days (28 Dec 98 – 4 Jan 99) ***TOTAL: 7 days approximately***	**130** **0.39 (1.2** duplicate) **7.5**	5 Nov 96 28 Dec 98 4 Jan 99		27 cfm at 120" (1996)	0.04 pound (1996)

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE4	85 to 105	**Note:** Soil gas sample via 24CPT37 at 96 feet had 47 ug/L of TCE on 11 September 1995. **Well 24SVE4 was constructed in 1995.** **1 day** or 4 hours (14 Nov 96) 3 days (7 Jan – 13 Jan (water in well caused system shut-down during test (9-11 Jan 99)) ***TOTAL: 3 days approximately***	**280** **60** **34 (56** duplicate) **28** **0.026**	14 Nov 96 7 Jan 99 8 Jan 99 11 Jan 99 13 Jan 99	GW in well	>131 at 55" (1996)	0.55 pound (1996)
24SVE5	68 to 88	Note: Soil gas sample via 24CPT13 at 98 feet had 2,310 ug/L of TCE on 14 September 1995. Well 24SVE5 was constructed in 1995. **1 day** or 4 hours (18 Nov 96) **20 days** (10 Mar-30 Mar 98) ***TOTAL: 21 days approximately***	**220** **20** **7.7** **0.014**	18 Nov 96 24 Mar 98 30 Mar 98 27 Jan 99		27 cfm at 110" (1996)	0.09 pound (1996) Calculations in progress for 1998 tests
24SVE5A	41.5 to 56.5	**Note:** Soil gas sample via 24CPT13 at 54 feet had 785 ug/L of TCE on 14 September 1995. **Well 24SVE5A was constructed in 1995.** **1 day** or 4 hours (20 Nov 96)	**360** **0.75**	20 Nov 96 27 Jan 99		65 cfm at 100" (1996)	0.35 pound (1996)
24SVE6	89 to 109.5	**Note:** Soil gas sample via 24CPT61 at 105 feet had 1,780 ug/L of TCE on 29 August 1995. **Well 24SVE6 was constructed in 1995.** **1 day** or 4 hours (8 Nov 96) 6 days (28 Dec 98- 4 Jan 99) ***TOTAL: 7 days approximately***	**440** **6.3** **24** **23 (21** duplicate)	8 Nov 96 28 Dec 98 29 Dec 98 4 Jan 99		>131 at 30" (1996)	0.86 pound (1996)
24SVP6 Piezometer	50 to 50.5 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	0.14	11 Jan 99		Not measured	
24SVP6A Piezometer	67 to 67.5 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	0.17	11 Jan 99		Not measured	
24SVE7	80 to 110	Note: Soil gas sample via 24CPT69 at 110 feet had 2,630 ug/L of TCE on 31 August 1995. Well 24SVE7 was constructed in 1995. **1 day** or 4 hours (31 Oct 96) **2 days** (13 – 15 January 1999)	**54** **140** **170 (130** duplicate) **180**	31 Oct 96 13 Jan 99 14 Jan 99 15 Jan 99	GW in well	180 cfm at 135" (1996) ~ 5 cfm at 120" (Jan 99)	0.15 pound (1996)
24SVE7A	63 to 74	**Note:** Soil gas sample via 24CPT69 at 54 feet had 741 ug/L of TCE on 31 August 1995. **Well 24SVE7A was constructed in 1995.** **1 day** or 4 hours (1 Nov 96) 3 days (15 – 18 January 1999)	**30** **16**	1 Nov 96 18 Jan 99		28 cfm at 110" (1996)	0.01 pound (1996)
24SVP7 Piezometer	54.5 to 55 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	6.4	11 Jan 99		Not measured	

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE8	83 to 113	**Note:** Soil gas sample via 24CPT58 at 96 feet had 1,270 ug/L of TCE on 15 September 1995. **Well 24SVE8 was constructed in 1995.** **1 day** or 4 hours (25 Oct 96) 2 days (4 – 6 Jan 99)	**100** **17** **18 (19** duplicate)	25 Oct 96 4 Jan 99 6 Jan 99		30 cfm at 105" (1996)	0.04 pound (1996)
24SVE8A	50 to 78	**Note:** Soil gas sample via 24CPT58 at 53 feet had 190 ug/L of TCE on 15 September 1995. **Well 24SVE8A was constructed in 1995.** **1 day** or 4 hours (24 Oct 96) 2 days approximately (19 - 21 Jan 99)	**45** **4.6** **12 (12** duplicate) **18 (2.9** duplicate)	24 Oct 96 19 Jan 99 20 Jan 99 22 Jan 99		70 cfm at 100" (1996)	0.05 pound (1996)
24SVP8 Piezometer	30.5 to 31 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing was completed in January 1999.	1.5	19 Jan 99		Not measured	
24SVE9	81 to 111	Note: Soil gas sample via 24CPT17 at 105 feet had 1,060 ug/L of TCE on 31 August 1995. Well 24SVE9 was constructed in 1995. **1 day** or 4 hours (21 Nov 96) **62 days** or 1,450.8 hours (15 May –16 Jul 97) **4 days** (8 – 12 Jun 98) ***TOTAL: 67 days***	**550** **170** **58** **41**	21 Nov 96 16 Jul 97 12 Jun 98 27 Jan 99	Travel time: 0.77 days per pore volume (EDR). Approx. 80 pore volumes removed during tests.	60 cfm at 95" (1996)	**19 pounds (through 1997)** Calculations in progress for 1998 tests
24SVE9A	55 to 85	**Note:** Soil gas sample via 24CPT17 at 82 feet had 439 ug/L of TCE on 31 August 1995**Well 24SVE9A was constructed in 1995.** **1 day** or 4 hours (22 Nov 96)	**36** **0.04**	22 Nov 96 27 Jan 99		20 cfm at 100" (1996)	0.01 pound (1996)
24SVP9 Piezometer	35.5 to 36 (approximately)	Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.	Not measured			Not measured	
24SVE10	79 to 109	**Note: Well 24SVE10 was constructed in 1995.** **1 day** or 4 hours (15 Nov 96) **44 days** or 1,005.9 hours (24 Mar – 7 May 97) **26 days** (25 Sep 97 – 20 Oct 97) 1 day (10-11 December 1998) ***TOTAL: 72 days approximately***	**1400** **230** **140** **26** **30 (33** duplicate) **32.5**	15 Nov 96 7 May 97 2 Oct 97 10 Dec 98 11 Dec 98 27 Jan 99	Travel time: 2.17 days per pore volume (EDR). Approx. 31 pore volumes removed during tests. GW at 104' [GW in well (Dec 98)]	250 cfm at 55" (1996)	5.24 pounds (1996) **308 pounds (through May 1997)** Calculations in progress for late 1997 and 1998 tests
24SVP10 Piezometer	55.5 to 56 (approximately)	Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.	Not measured			Not measured	
24SVP10A Piezometer	38 to 38.5 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing was completed in December 1998.	0.15	10 Dec 98		Not measured	

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVE11	79 to 109	Note: Soil gas sample via 24CPT59 at 100 feet had 200 ug/L of TCE on 18 September 1995. Well 24SVE11 was constructed in 1995. **1 day** or 4 hours (25 Nov 96) **24 days** (28 Apr - 21 May 98) 2 days (13 – 15 January 1999) ***TOTAL: 26 days approximately***	**300** **23** **160** **120** **96 (83** duplicate)	25 Nov 96 29 Apr 98 8 May 98 21 May 98 14 Jan 99	GW in well	60 cfm at 100" (1996)	0.27 pound Calculations in progress for 1998 tests
24SVE11A	43 to 73	**Note:** Soil gas sample via 24CPT59 at 52 feet had 461 ug/L of TCE on 18 September 1995**Well 24SVE11A was constructed in 1995.** **1 day** or 4 hours (26 Nov 96) 3 days (15 – 18 January 1999)	**0.14** **38**	26 Nov 96 18 Jan 99		27 cfm at 115" (1996)	
24SVP11 Piezometer	23.5 to 24 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	6.6	11 Jan 99		Not measured	
24SVE12	34 to 74	**Note: Well 24SVE12 was constructed in 1995.** **1 day** or 4 hours (30 Dec 97) 6 days (26 January – 1 February 1999)	**330** **160** **77** **110 (100** duplicate)	30 Dec 97 28 Jan 99 29 Jan 99 1 Feb 99			Calculations in progress
24SVE13	79 to 109	**Note: Well 24SVE13 was constructed in 1995.** Soil gas sample via 24CPT41 at 92 feet had 192 ug/L of PCE on 1 September 1995. **1 day** or 4 hours (27 Nov 96) **28 days** (12 Nov – 17 Dec 98) ***TOTAL: 29 days approximately***	**4.1 (TCE)** **120 (PCE)** **92 (PCE)** **42 (PCE)** **4.1 (TCE)**	27 Nov 96 27 Nov 96 18 Nov 98 17 Dec 98 17 Dec 98		40 cfm at 110" (1996)	Calculations in progress (PCE mass)
24SVP13 Piezometer	71.5 to 72 (approximately)	Note: Piezometer was constructed in 1995. Evaluation of condition of piezometer is in progress.	Not measured			Not measured	
24SVE14	78 to 108	**Note: Well 24SVE14 was constructed in 1995.** **1 day** or 4 hours (7 Nov 96) 6 days (21 Dec – 28 Dec 98) 65 days approximately (19 Jan – 26 Mar 99)	**110** **760** **940** **780** **420 (120** duplicate) **410 (140** duplicate) **180** **168 (172** duplicate) **110**	7 Nov 96 21 Dec 98 22 Dec 98 28 Dec 98 20 Jan 99 25 Jan 99 2 Feb 99 16 Feb 99 26 Mar 99	124 IWG applied at 24SVE14 resulted in 0.7 IWG at 24SVE8 (450 feet away) during 1996 pilot test	120 cfm at 120" (1996)	0.2 pound (1996)

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVP14 Piezometer	49.5 to 50 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	27	11 Jan 99			
24SVP14A Piezometer	29.5 to 30 (approximately)	Note: Piezometer was constructed in 1995. Preliminary testing completed January 1999.	33	11 Jan 99			
24SVP14S Piezometer [PZ14S]	83.0 to 88.0	Constructed 1 March 1999. One-half inch diameter PVC.	**0.52**	3 Mar 99			
24SVE104B	25 to 45	**Note: Well 24SVE104B was constructed 16 Nov 1998. 2 days (30 Nov 98 – 2 Dec 98)**	**1.3 (1.3 duplicate)** **1.8** **1.2**	1 Dec 98 2 Dec 98 27 Jan 99	Located within 500 ug/L TCE vapor concentration contour for shallow zone established in 1995	~200 cfm at ~20" (22 cfm at 92 IWG per EDR)	
24SVE107	70 to 95	**Note: Well 24SVE107 was constructed 17 Nov 1998. 5 days (2 Dec – 7 Dec 98)**	**14** **4.4** **7.5**	3 Dec 98 7 Dec 98 27 Jan 99		~40 cfm at ~100" (22 cfm at 92 IWG per EDR)	
24SVE161	70 to 95	**Note: Well 24SVE161 was constructed 19 Nov 1998. 3 days (7 Dec 98 – 10 Dec 98)**	**82** **61**	7 Dec 98 9 Dec 98	GW in well (Dec 98) Located within 500 ug/L TCE vapor concentration contour for deep zone established in 1995	~50 cfm at ~95" (228 cfm at 47 IWG per EDR)	
24SVE116	75 to 95	**Note: Well 24SVE116 was constructed 16 Dec 1998. 4 days (17-21 Dec 98) approximately**	**130** **82** **65**	17 Dec 98 21 Dec 98 27 Jan 99		~75 cfm at ~80" (22 cfm at 92 IWG per EDR)	
24SVE54	75 to 95	**Note: Well 24SVE54 was constructed 17 Dec 1998. 2 days (5 – 7 Jan 1999) __ days (2 February - _____) Test in progress**	**26** **460** **400 (430** duplicate) **144** **106** **75 (65** duplicate)	5 Jan 99 6 Jan 99 7 Jan 99 4 Feb 99 9 Feb 99 24 Mar 99		~20 cfm at 100" (22 cfm at 92 IWG per EDR)	

Table 1. (continued)

Vapor Extraction Well ID	Screened Interval (Feet BGS)	Approximate Date(s) of SVE Operations	TCE Vapor Influent Concentrations (ug/L) unless otherwise noted	Date(s) of TCE Vapor Analyses	Comments	Average Flows (from various tests or from the EDR)	TCE Soil Gas Removal Estimates
24SVP54N Piezometer [PZ54-N]	91.5 to 96.5	Constructed 25 February 1999. One-half inch diameter PVC.	**0.5**	1 Mar 99	Preliminary Data		
24SVP54S Piezometer [PZ54-S]	83.5 to 88.5	Constructed 26 February 1999. One-half inch diameter PVC.	**90**	1 Mar 99	Preliminary Data		
Central System Low-Flow Test		**Wells 24SVE5, 24SVE5A, 24SVE9, 24SVE9A, 24SVE10, 24SVE104B, 24SVE107, & 24SVE116 were connected to the Central System on 27 and 28 January 1999 to test the Central System for low-flow operations (~24-hour test duration).**	**26** **18**	27 Jan 99 28 Jan 99		Approximately 700 scfm	
		NOTE: Data from the Groundwater Remediation Pilot Test is presented for reference only (Source of Information: Draft Groundwater Remediation Pilot Test Report – Site 24 (Bechtel, December 1998).					
24EX3	105-180	132-day vacuum-enhanced GW extraction pilot test (22 Oct 97 – 15 May 98)	**39** **Range: ND to 148**	15 May 98	Near 24SVE10	Approximate range: 80-140 scfm	55.45 pounds of TCE vapor mass removed
24EX4	104-190	19-day vacuum-enhanced GW extraction pilot test (6 Jan 98 – 27 Jan 98)	**75** **Range: 42 to 258**	27 Jan 98	Near 24SVE9	Approximate range: 20-29 scfm	4.06 pounds of TCE vapor mass removed
24EX5	104-154	20-day vacuum-enhanced GW extraction pilot test (31 Mar 98 – 21 Apr 98)	**38** **Range: ND to 118**	21 Apr 98	Near 24SVE54	Approximate range: 5 to 28 scfm	1.04 pound of TCE vapor mass removed
24EX6	103-173	21-day vacuum-enhanced GW extraction pilot test (2 Jun 98 – 29 Jun 98)	**26** **Range: ND to 455**	29 Jun 98	Near 24SVE2	Approximate range: 62 to 69 scfm	2.93 pounds of TCE vapor mass removed

Mass calculations are in progress for the rebound and initial testing operations.

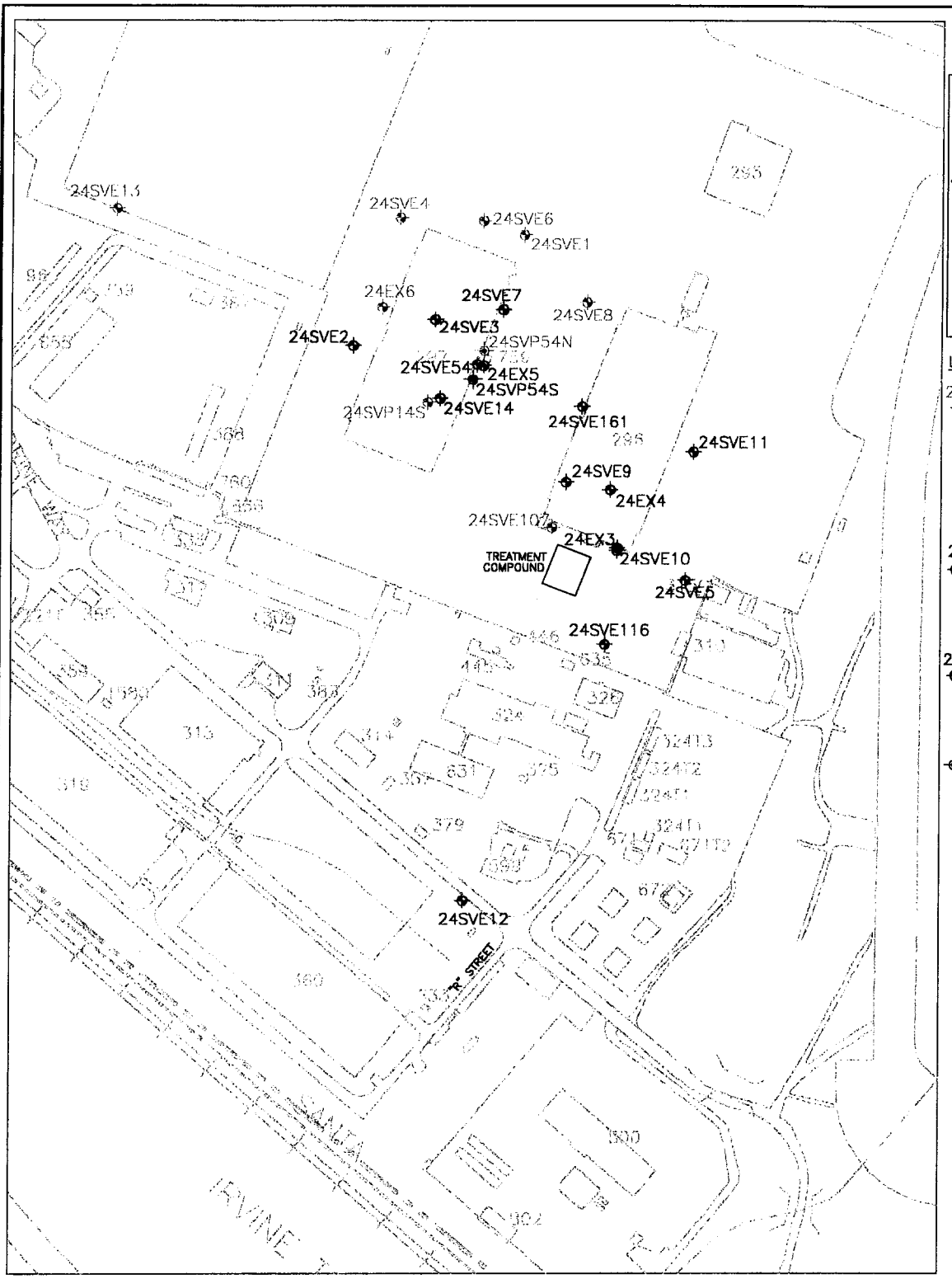
The Draft Final Interim Record of Decision, Operable Unit 2A, Site 24 – VOC Source Area, Vadose Zone, Marine Corps Air Station, El Toro (September 1997) states that approximately 870 pounds of TCE mass were removed during the SVE pilot test activities conducted during 1996 and 1997.

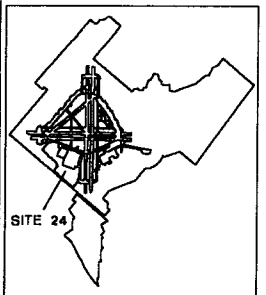
Exhibits

1 TCE Concentrations in the Deep Vadose Zone As of March 1999

2 Selected TCE Influent Vapor Concentrations at Wells 24SVE14 and 24SVE54

3 Photograph of Portable SVE Unit at Well 24SVE14





LEGEND

24SVE6
VAPOR EXTRACTION WELLS WITH CONCENTRATIONS EQUAL TO OR LESS THAN THE TARGET CLEANUP LEVELS ESTABLISHED IN THE INTERIM ROD

24SVE9
VAPOR EXTRACTION WELLS BETWEEN TARGET CLEANUP LEVEL AND 100 ug/L

24SVE2
VAPOR EXTRACTION WELLS GREATER THAN 100 ug/L

PIEZOMETER WELL

N

GRAPHIC SCALE
0 100 200 400
(IN FEET)

NOTES:
1. PRIMARY SOURCES OF INFORMATION ARE THE DRAFT FINAL ENGINEERING DESIGN REPORT (BECHTEL, 1998), THE DRAFT GROUNDWATER REMEDIATION PILOT TEST REPORT (BECHTEL, 1998), THE "DRAFT FINAL INTERIM RECORD OF DECISION, OPERABLE UNIT 2A, SITE 24–VOC SOURCE AREA, VADOSE ZONE, MCAS EL TORO (MCAS EL TORO, SEPTEMBER 1997), AND PRELIMINARY LABORATORY DATA PACKAGES (IT/OHM, 1998–1999)".
2. GROUNDWATER EXTRACTION WELLS 24EX3, 24EX4, 24EX5 AND 24EX6 ARE PRESENTED ON THIS MAP BECAUSE THEY ARE LOCATED INSIDE OF THE 500 MICROGRAM PER LITER CONTOUR FOR TCE (AS ESTABLISHED DURING THE REMEDIAL INVESTIGATION OF 1995) AND BECAUSE VACUUM–ENHANCED GROUNDWATER EXTRACTION UTILIZING A PORTABLE SOIL VAPOR EXTRACTION (SVE) TREATMENT SYSTEM WAS CONDUCTED AT THESE WELLS DURING THE PILOT TESTS OF 1997 AND 1998.
3. LOCATIONS OF WELLS AND SURFACE FEATURES ARE INTENDED FOR ILLUSTRATION AND GENERAL USE ONLY. LOCATIONS OF WELLS ARE APPROXIMATE.

SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND

MCAS EL TORO, CA

TCE CONCENTRATIONS IN THE DEEP VADOSE ZONE AS OF MARCH 1999
VADOSE ZONE REMEDIATION – IRP SITE 24

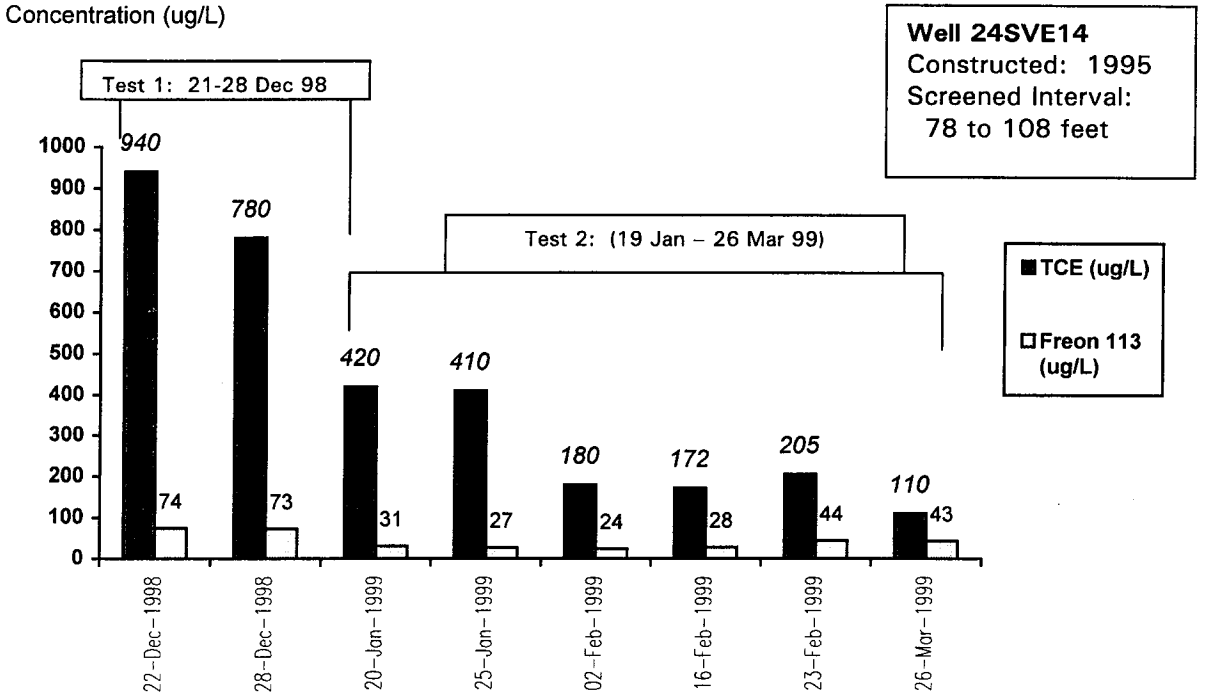
FILE NO.		DATE
18292121.DWG	EXHIBIT 1	

Witzel-Yanez Design 4/12/99 4:01 PM 18292121.dwg

Selected SVE Data
(Preliminary Results)

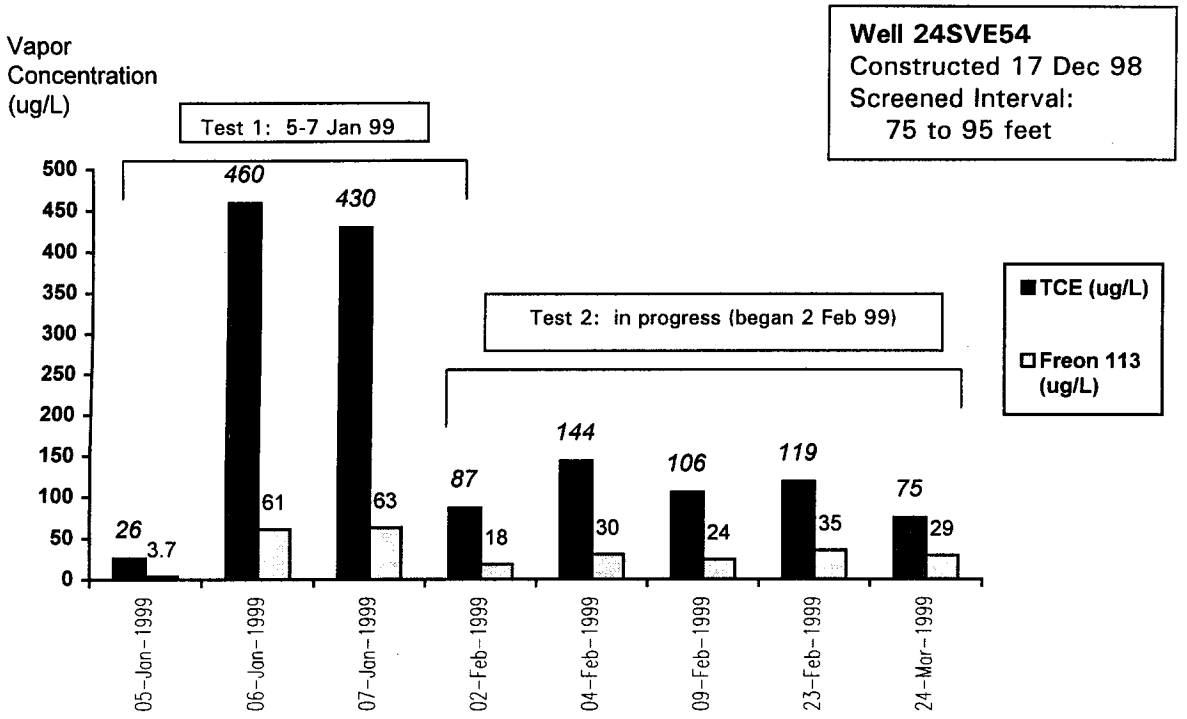
Recent TCE and Freon 113 Vapor Concentrations During Rebound Tests at Well 24SVE14
IRP Site 24 - VOC Source Area, MCAS El Toro

Preliminary Data – For Discussion Only



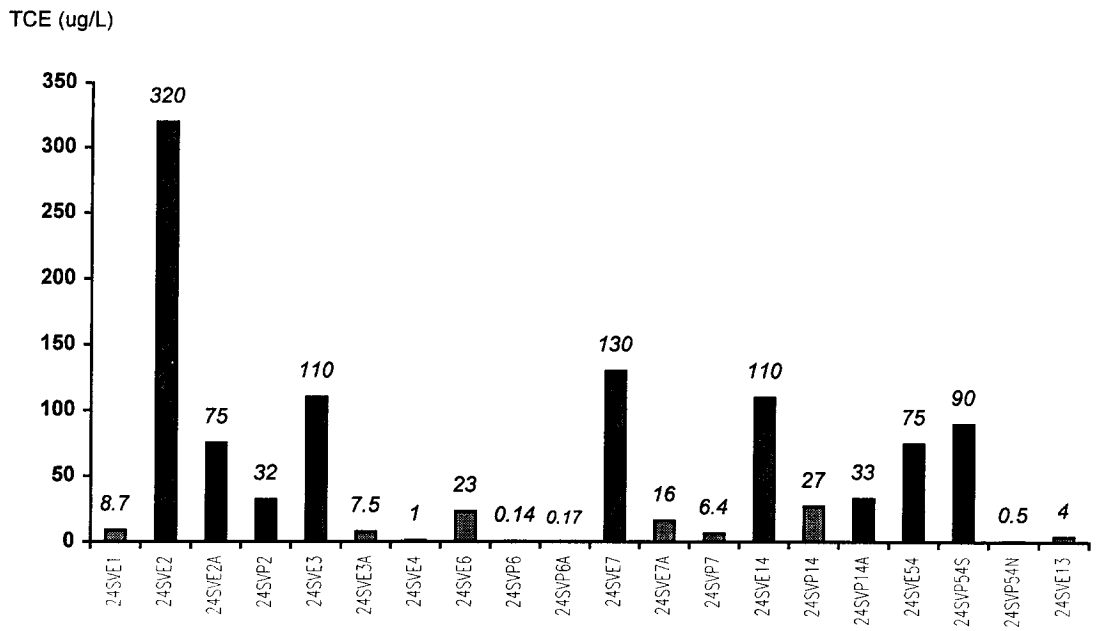
Recent TCE and Freon 113 Vapor Concentrations During Rebound Tests at Well 24SVE54
IRP Site 24 - VOC Source Area, MCAS El Toro

Preliminary Data – For Discussion Only

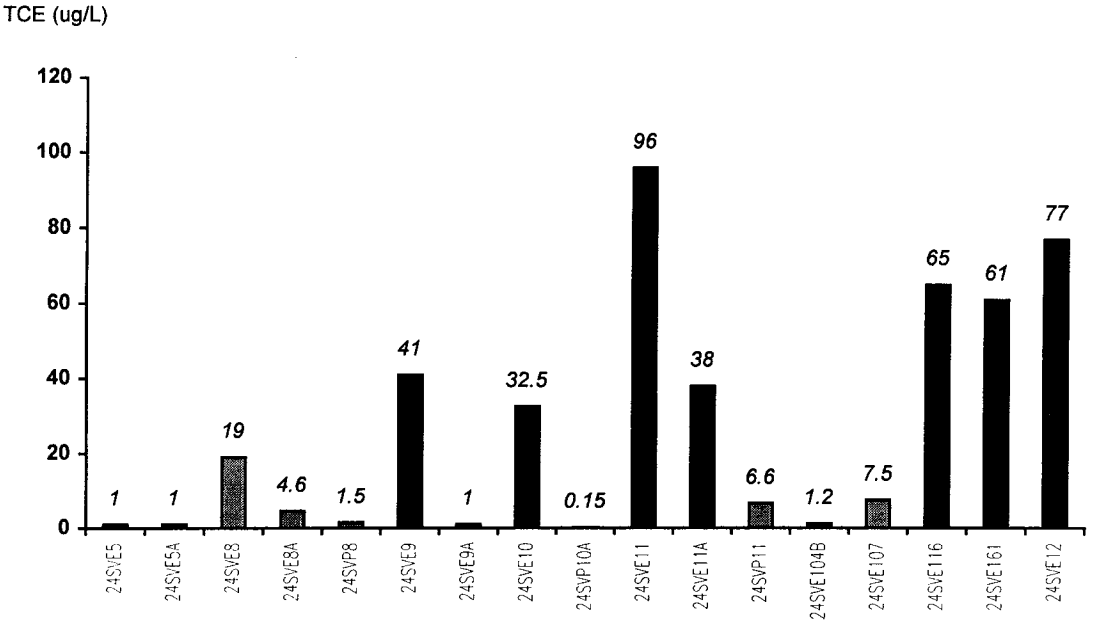


Recent TCE Vapor Concentrations at SVE Wells as of 31 March 1999
IRP Site 24 - VOC Source Area, MCAS El Toro

Building 297 Vicinity



Building 296 Vicinity



Legend

24SVE1 Deep Vadose Zone Well
24SVE2A Intermediate Depth Vadose Zone Well
24SVE104B Shallow Vadose Zone Well
24SVP6 Piezometer
24SG82 Soil Gas Sample Point (2 to 3 samples per point, highest TCE level shown)
At or below 27 ug/L TCE
28-100 ug/L TCE
Greater than 100 ug/L TCE

***Target** Threshold Levels (Draft Final Interim ROD, September 1997)*

TCE 27 ug/L	C Cl4 61 ug/L
PCE 69 ug/L	1,1 DCE 563 ug/L
Freon 113	234,000 ug/L

SOUTHWESTNAVFACENGCOM
Code 5BME.LMH

Portable Soil Vapor Extraction (SVE) Treatment Unit at Well 24SVE14

Installation Restoration Program (IRP) Site 24

Building 297, Marine Corps Air Station, El Toro

[Date of Photograph: February 1999]

OHM Remediation Services Corp.
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CONTRACT N68711-93-D-1459 **DOCUMENT CONTROL NO: SW6626**

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1220 Pacific Highway
San Diego, California 92132-5101

Date: 16-Apr-99

D.O.: 65

Location: MCAS EL TORO

FROM: Stewart Bornhoft, Program Manager — Edwin G. Bond, Contracts Manager

DESCRIPTION OF ENCLOSURE: ***Technical Memorandum, Progress Report, Phase I Vadose Zone Remediation Activities, Installation Restoration Program Site 24, dated April 15, 1999***

TYPE: Contract Deliverable ( ) ($) D. O. Deliverable (X) (Tech) Request for Change ( ) Other ( )

VERSION: FINAL **REVISION:** 0

ADMIN RECORD: Yes (X) No ( ) Category ( ) Confidential ( )

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